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Data-enabled Design. A situated design approach that uses data as creative material when designing for intelligent ecosystems

Impact Case Study

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Year of completion:	2019
Discipline/field:	Industrial Design
Type of Doctorate (e.g. PhD, DDes, ArtD)	PhD
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Abstract

An increasing amount of interactive products and services, that people interact with on a daily basis, collect data about how they are being used. This enables these products to gain a detailed and nuanced understanding of their user(s) and the context they are situated in, based on which they can adapt their behaviour and

interaction. Next to this, the increased connectivity of these products and services makes that they become part of larger ecosystems in which multiple users, products and services interact. We refer to this new generation of intelligent and connected products as intelligent ecosystems.

Our research investigates how data, that is a crucial part of intelligent ecosystems, can be utilized when designing for them.
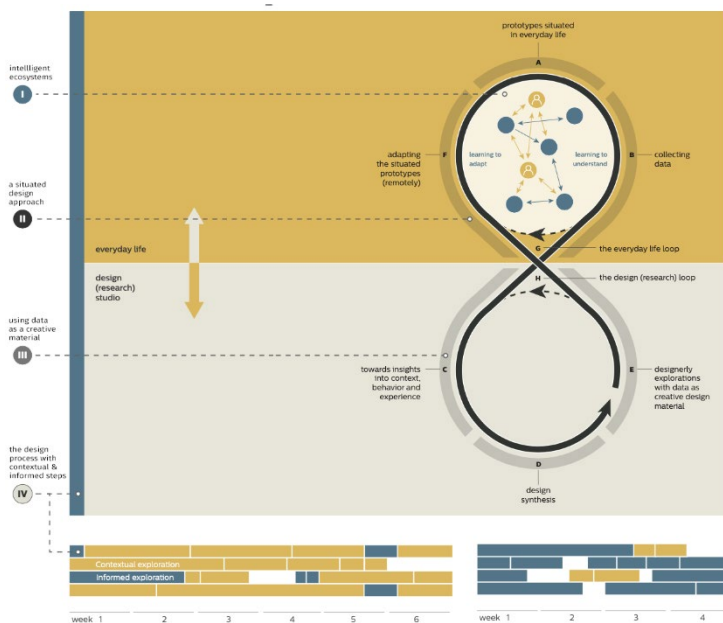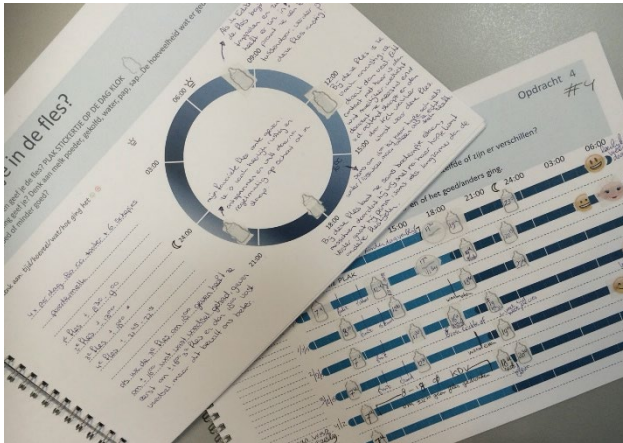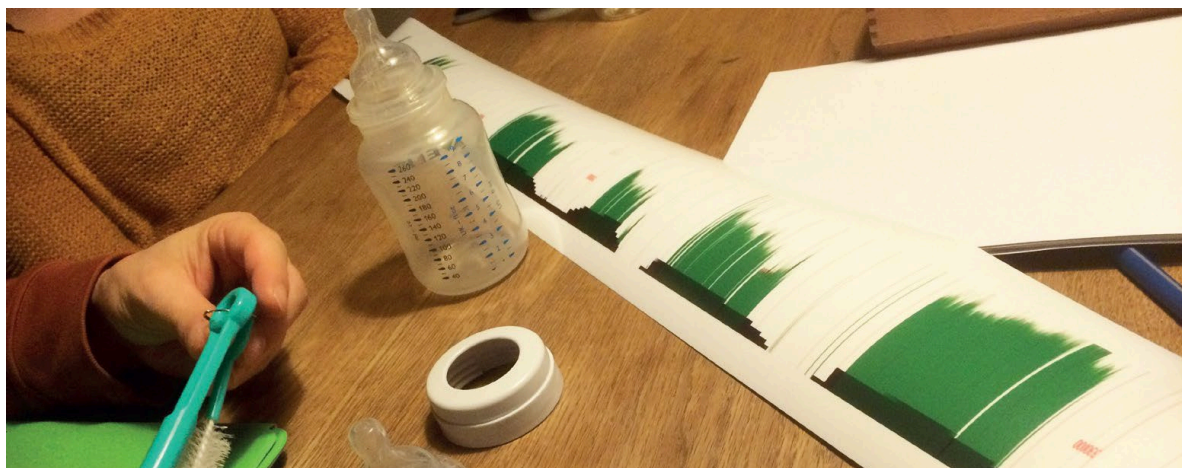
This dissertation starts by presenting a user-experience oriented perspective and an experimental prototype-centric perspective. These perspectives are used as the main building blocks for the data-enabled design methodology that we set out to develop. After that, we present three design case studies that explore how data can be employed to design for intelligent ecosystems, in the context of baby feeding, baby health and personal health. These case studies, that were executed at Philips Design, are used to iteratively advance the data-enabled design methodology and our understanding of intelligent ecosystems.

Where well-known approaches, that use data in design assign a more evaluative and directive role to data, data-enabled design argues for more explorative and creative situated design explorations. To guide design researchers and practitioners in the setup and execution of the methodology we present a framework for data-enabled design. This framework presents a situated design approach, provides clear handles on the role data plays in situated design explorations, and explains how different explorations can be orchestrated in the design process to design for intelligent ecosystems.

Summary of impact beyond academia

The research enhanced and spiked business cases, such as Philips' currently commercially available Smart Bottle and the Taking Care of Yourself app. The unique features in these concepts are patented and transferred to the business units within Philips. Moreover, these have received multiple design awards (i.e., Red Dot design award).

Next, based on the huge potential of Data Enabled Design, Philips Experience Design decided to start the Data Enabled Design team in April 2018, a group of data designers with expertise on data visualization, user experience research and prototyping with/around data and AI. The team is led by supervisor dr. ir. Eva Deckers.

Moreover, the collaboration between ID and Philips continued, as part of the large Eindhoven MedTech Innovation Centre (eMTIC) between Catharina Hospital (CH), the Maxima Medical Center (MMC), Kempenhaeghe Epilepsy and Sleep Center (KH), Eindhoven University of Technology (TU/e) and Royal Philips Eindhoven (RPE), including new PhDs working on and with data-enabled design.

Underpinning research, context and summary of methodology

Data-Enabled Design is a situated design approach that uses data as creative material when designing for intelligent ecosystems and is situated at the intersection of a user-experience and an experimental prototype-centric perspective. Data-Enabled Design enables iterative, explorative, quick, and creative design explorations in context, using a two-step approach were design practice and research join forces. During the first research-oriented contextual step, the design team seeks to understand the contextual, behavioural and experiential design space in a detailed and nuanced way. During the second design-oriented informed step, the design team uses the insights obtained to continuously explore (new) aspects of the intelligent solution from a distance. To do this, open and adaptable physical / digital tools and prototypes are used that are situated in and adapted to the daily life of people. This situated design approach with its two-step process is captured in the framework of Data-Enabled Design, which offers design researchers and practitioners clear handles on how to orchestrate data-enabled exploration in the design process.

Data Enabled Design is cutting edge design research that anticipates the increasing role of data and AI in society and the design field. Instead of simply following the developments in ICT and big data, it takes the unique approach of making data meaningful at the human scale, by integrating big and small data approaches as well as quantitative and qualitative data approaches. Data Enabled

Design takes a distinctive designerly perspective, by using data as creative material to investigate, inspire and inform new design interventions, instead of using data in an evaluative and directive role as most well-known approaches do. Data is put at use to research and explore situated design opportunities through an intelligent ecosystem of collection of products and services. On the one hand, these IoT devices and services allow the design team to get a detailed and nuanced understanding of people in their context, and on the other hand enable them to create opportunities for sparking experiences that are meaningful to people. This continuous data-enabled engagement allows people to appropriate and personalise the devices and tools in a way that is meaningful for them in their context; this is what makes this approach unique. It doesn't aim to use data for abstraction, reduction and generating absolute generalized insights. Instead, it embraces the nuances of small data in concrete situations, while using the power of AI and big data tools. It brings in the richness of small data with big data analysis techniques in a way that goes beyond single human capabilities, thus adding new value and knowledge to the design process. It is also offering more traditional and analogue field of Industrial Design that are not prone to or experienced in designing interactive and intelligent products, ways to explore and incorporate data and AI in their designs. Additionally, design is also offering a new perspective, view, framework, and new tools that can support other disciplines and researchers in the realm of data science and AI through this unique approach.

References produced by researcher from/during doctoral research

Janne van Kollenburg & Sander Bogers. 2019. Data-enabled design: a situated design approach that uses data as creative material when designing for intelligent ecosystems. PhD thesis. Technische Universiteit Eindhoven.

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Janne van Kollenburg, Sander Bogers, Heleen Rutjes, Eva Deckers, Joep Frens and Caroline Hummels. 2018. Exploring the Value of Parent-Tracked Baby Data in Interactions with Healthcare Professionals: A Data-Enabled Design Exploration. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI'18).   *Honorable Mention

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Details of impact

2 product launches: Smart bottle & Taking Care of Yourself (formerly known as Caring Home)

We started to hire and compose a team of 15+ FTE data designers for running Data-enabled Design projects.

Follow up PhD projects: 3 PhDs building on the Data-enabled Design methodology

Showcasing projects at the Dutch Design Week 2020 – Philips Museum Eindhoven

IP generation: 2 patents

Design awards: Red dot award for Smart Bottle 2019 and IF award for Taking Care of Yourself 2021

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